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A STUDY OF THE BATS OF THE GENUS *DERMONOTUS* (*PTERONOTUS* Auct.).

BY JAMES A. G. REHN.

During the preparation of this paper a series of thirty-six specimens of the genus have been examined, all being from the collections of the United States National Museum, the Biological Survey of the United States Department of Agriculture and the American Museum of Natural History. The author wishes to express his indebtedness to the gentlemen in charge of the collections of the above institutions for permitting the examination of the specimens.

**DERMONOTUS** Gill.

1838. *Pteronotus* Gray, Mag. Zool. and Botany, II, p. 500. Type, *Pteronotus davyi* Gray. (Not of Rafinesque, 1815.)  
 1843. *Chilonycteris* Wagner, Archiv für Naturgeschichte, IX, bd. I, p. 367. (Part.)  
 1844. *Pteronotus* Gray, Voyage of the Sulphur, I, Mammalia, p. 24.  
 1850. *Chilonycteris* Wagner, Abhandlungen Mathem.-Physik Cl. Akad. Wissenschaften, München, V, p. 179. (Part.)  
 1854. *Chilonycteris* Burmeister, Thiere Brasiliens, I, p. 74. (Part.)  
 1855. *Chilonycteris* Wagner, Suppl. Schreber's Säugethiere, V, p. 677. (Part.)  
 1855. *Pteronotus* Wagner, Suppl. Schreber's Säugethiere, V, p. 700.  
 1872. *Pteronotus* Peters, Monatsber. K. Preuss. Akad. Wissensch., Berlin, p. 361.  
 1878. *Chilonycteris* Dobson, Catal. Chiropt. Brit. Mus., p. 447. (Part.)  
 1879. *Chilonycteris* Alston, Biol. Cent.-Amer., Mamm., p. 34. (Part.)  
 1890. *Pteronotus* J. A. Allen, Bull. Amer. Mus. Nat. Hist., III, p. 178.  
 1892. *Chilonycteris* Thomas, Ann. and Mag. Nat. Hist., 6th ser., X, p. 410. (Not of Gray.)  
 1894. *Pteronotus* J. A. Allen, Bull. Amer. Mus. Nat. Hist., VI, p. 248.  
 1901. *Dermonotus* Gill, Proc. Biol. Soc. Washington, XIV, p. 177. (To replace *Pteronotus* Gray.)  
 1902. *Dermonotus* Miller, Proc. Biol. Soc. Washington, XV, p. 155.

*Generic Characters.*—Naked volar membranes extending over the back attached only along the median line and across the shoulders, anterior to which section the dorsal surface is normally furred. Skull with the brain-case moderately elevated and rostrum distinctly inflated. Dentition i.  $\frac{2-2}{2-2}$ , c.  $\frac{1-1}{1-1}$ , p.  $\frac{2-2}{3-3}$ , m.  $\frac{3-3}{3-3}$ .

*History.*—The genus *Dermonotus* (*Pteronotus* Gray) is so closely related to *Chilonycteris* and *Mormoops* that its history is in great part a repetition of that witnessed in these two genera. As considerable

space has already been given to the taxonomic history of *Mormoops*<sup>1</sup> and *Chilonycteris*,<sup>2</sup> only such points as differ will be noticed. The genus was originally based on a specimen from Trinidad, and associated by Gray with the following genera: *Cheiromeles*, *Nyctinomus*, *Molossus*, *Thyroptera*, *Myopterus* and *Dididurus*. Wagner, in 1843, described a specimen of this genus, taken by Natterer at Cuyaba, Brazil, as *Chilonycteris gymnonotus*, unaware that Gray had created a genus for this type of bat. Later, in 1855, he apparently did not recognize his species as a close relative of Gray's *Pteronotus davyi*, as he associated the latter, which he, of course, had never seen, with *Cheiromeles* and *Dysopes* in the section *Macrura*. The question as to the tenability of the genus as distinct from *Chilonycteris* later caused a great amount of shifting, the individual opinions of Peters, Dobson, Alston, and Thomas differing as to the recognition of the genus. In 1892 Thomas described a race of *davyi* from Jalisco, Mexico, basing it on the brilliant fulvous coloration of the Mexican specimens, and their slightly smaller size. Gill, in 1901, discovered the fact that Gray's *Pteronotus* was preoccupied by *Pteronotus Rafinesque*, a synonym of *Pteropus*, and to meet the deficiency he proposed the name *Dermonotus*.

*General Relations.*—The genus *Dermonotus* is closely associated with *Mormoops* and *Chilonycteris*, which constitute the subfamily *Mormoopinae*. The characters of the genus are such that recent workers have all accorded it full generic rank, and as Gill has stated (*l.c.*), modern systematic standards would fully allow the maintenance of the genus as distinct from *Chilonycteris*. An interesting character noted in this genus, as in the two allied genera, is the occurrence of dichromatism. The two phases are quite marked, one being dull chocolate-brown, the other rich fulvous.

#### *Key to the Forms.*

- a.*—First upper premolar longitudinal, not crowded; forearm averaging 46.2 mm., . . . . . *davyi* (Gray).
- aa.*—First upper premolar nearly transverse, strongly crowded between the canine and second upper premolar; forearm averaging 44.1 mm., . . . . . *davyi fulvus* (Thomas).

#### **Dermonotus davyi** (Gray).

1838. *Pteronotus Davyi* Gray, Mag. Zool. and Botany, II, p. 500. [Trinidad.]

1843. *Chilonycteris gymnonotus* Wagner, Archiv für Naturgeschichte, IX, bd. I, p. 367. [Cuyaba.]

<sup>1</sup> *Proc. Acad. Nat. Sci. Phila.*, 1902, pp. 160–172.

<sup>2</sup> *Ibid.*, 1904.

1844. *P[teronotus] Davyi* Gray, Voyage of the Sulphur, I, Mammalia, p. 24. [Trinidad.]
1850. *Chilonycteris gymnonotus* Wagner, Abhandlungen Mathem.-Physik. Cl. Akad. Wissenschaften, München, V, p. 179. [Cuyaba, Matto Grosso.]
1854. *Chilonycteris gymnonotus* Burmeister, Thiere Brasiliens, I, p. 75. [Cuyaba, Matto Grosso.]
1855. *Ch[ilonycteris] gymnonotus* Wagner, Suppl. Schreber's Säugethiere, V, p. 680, Pl. 48. [Matto Grosso.]
1855. *P[teronotus] Davyi* Wagner, Suppl. Schreber's Säugethiere, V, p. 700. [Trinidad.]
1872. *Pteronotus Davyi* Peters, Monatsb. K. Akad. Wissensch., Berlin, p. 361. [Brazil; Mexico.] (Part.)
1878. *Chilonycteris davyi* Dobson, Catal. Chiropt. Brit. Mus., p. 453, Pl. XXIII. [Puerto Cabello; Venezuela.]
1879. *Chilonycteris davyi* Alston, Biol. Cent.-Amer., Mamm., p. 36. [Mexico; Venezuela; Trinidad; Brazil.] (Part.)
1892. *Chilonycteris Davyi* Thomas, Ann. and Mag. Nat. Hist., 6th ser., X, p. 410. [Trinidad; Dominica; Venezuela.]
1892. *Chilonycteris davyi* Thomas, Journal Trinidad Field Naturalists' Club, I, p. 162. [Trinidad.]
1902. *D[ermonotus] davyi* Miller, Proc. Biol. Soc. Washington, XV, p. 155. [Dominica; Trinidad.]

*Type Locality*.—Trinidad.

*Distribution*.—Brazil; Puerto Cabello, Venezuela, and Trinidad and Dominica in the West Indies.

*General Characters*.—Size medium; character of the volar membranes as described under the genus.

*Head*.—Occiput dome-shaped and evenly rounded; rostrum rather depressed, broad. Ear rather elongate, acuminate; internal margin with the internal ridge very distinctly developed and forming a rounded lobe inferiorly, superiorly with a blunt but distinct shoulder, beyond which infra-median point the internal margin is evenly arcuate, curving back to the recurved and very bluntly falcate apex; external margin carried forward inferiorly to the angle of the mouth, external shoulder rounded and median in position, superior portion of the external margin straight except for a marked concavity caused by the recurved apex. Tragus subrectangulate, apical portion narrower than the basal half; external margin sinuate; apex rounded; accessory lobe rather small, subhorizontal, rounded, forming a distinct shoulder or ledge; internal margin inferior to the accessory lobe, sinuate and with a distinct marginal thickening. Nostrils surrounded by a very slight raised margin, and surmounted by a fleshy ridge, which is considerably excavated in the area superior to the nasal division; lateral portions of muzzle with a raised fleshy ridge, which is separated from the nose-pad by a rather deep incision. Superior portion of the muzzle with a median rounded swelling situated a short distance back from the nostrils. Labial chin-lappet strongly transverse, the lateral portions rather inconspicuous and merging into the lip proper, median portion

distinctly papillose, the papillæ bordering the arched incision separating the smooth incisive pad larger than the others; posterior chin-lappet almost equal to the labial in width, thin, closely adpressed.

*Limbs.*—Forearm of medium length, very distinctly arcuate though the distal portion is considerably straighter than the proximal; third finger slightly more than one and one-half times the length of the forearm. Femora, tibiæ and feet rather slender; calcanea about a fourth as long again as the tibiæ.

*Membranes and Fur.*—Membranes rather thin, but very tough and leathery; propatagium deep, extending free to the thumb; endopatagium and mesopatagium with the longitudinal nerves very regularly and completely distributed, endopatagium attached along the median line of the body by a thin membrane, otherwise free except that anteriorly it is squarely attached across the shoulders and posteriorly it is tightly attached from the middle of the femur to its margin slightly below the middle of the tibia; uropatagium large, the calcanea bound down to the tibiæ to a point opposite the attachment of the endopatagium, tail with the enclosed portion slightly exceeding the free apical section. Fur woolly, evenly distributed over the visible and concealed sections of the dorsal surface and also the entire venter; membranes almost entirely covered with extremely fine short hair; muzzle and lips with groups of distinctly setiform hairs.

*Color.*<sup>3</sup>—General color vandyke-brown, membranes and ears with a slight touch of blackish. It is quite probable that typical *davyi* will be found to possess a rufous form, as two phases of coloration have been found in almost all the other species and races of the Mormoopinæ. The distinct color phases of *D. davyi fulvus* are very marked, but possibly the more southern type possesses but one color form, or one strongly predominating phase, a case of which is probably found in *Chilonycteris rubiginosa* and *rubiginosa mexicana*.

*Skull.*—Rather fragile; rostrum considerably inflated and somewhat depressed. Brain-case evenly arched transversely and with a slight longitudinal depression, dipping suddenly toward the rostrum; zygomatica widest posteriorly and without any distinct arcuation. Rostrum very distinctly inflated, the greatest width over the posterior molars; nasal depression broad, smoothly excavated. Mandible rather long, the ascending ramus very low and weak; coronoid and condylar processes low, inconspicuous and equal in development; angle strongly curved laterally and with a recurved tip.

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<sup>3</sup> From alcoholic specimens.

*Teeth*.—Central pair of upper incisors broad with a straight, slightly bilobate cutting edge; lateral upper incisor low, in basal outline equal to the median tooth; upper canine slightly recurved; first upper premolar subovate in basal outline, the greatest length of the tooth sublongitudinal; second upper premolar subpentagonal in outline, transverse, cusp distinct and caniniform, internal cingulum developed as a distinct rim to a slightly excavated area; first and second upper molars subquadrate, with the para-metaconoid ridges distinct and high, the paracone developed as a distinct shoulder, protocone and hypocone distinct, the former higher than the latter; third upper molar transverse, para-metaconoid ridge deflected internally, protocone quite distinct. Lower incisors obscurely tridentate, the median teeth in size considerably exceeding the laterals which are crowded against the canines; lower canines erect, slightly curved and slightly tapering; first lower premolar subquadrate in basal outline, cusp longitudinal, acute-angulate; second lower premolar very small, circular in basal outline, crowded between the first and third premolars and deflected toward the lingual side of the tooth-row; third lower premolar rather elongate-quadrate, cusp rather high, acute; molars with the interspaces deeply excavated, the paraconid and hypoconid lower than the other cusps.

*Measurements*.—Average of five Dominican specimens: Total length 70.8 (70–75) mm.; head and body 52.2 (51.3–53); head 18.9 (18.1–19.5); ear 16 (15.5–17); tragus 4.8 (4.5–5.5); forearm 46.2 (45–48); thumb 8.5 (8.1–9.1); third digit 77.4 (75–79); tibia 17.5 (17–18.1); calcaneum 21.6 (19–24); foot 11.1 (10.8–11.5); tail 20.6 (18–22).

Average of two Dominican skulls: Total length 16.7 (16.5–17); greatest zygomatic breadth 9.1 (9–9.3); interorbital width 4; height at base of the second premolar 3.9 (3.8–4); height of brain-case 6.7 (6.4–7); width of palatal constriction 1.3; length of palate from anterior foramina 7.1 (7–7.3); width of palate including teeth 6.2 (6.1–6.3); greatest length of mandible 11.9 (11.6–12.3); breadth of brain-case above roots of zygomata 8.3 (8.2–8.5).

*Remarks*.—This form is apparently uniform in size through its range, as Wagner's measurements of the type of *gymnonotus* (*l.c.*) are not materially different from those of the Dominican series examined. The typical form can readily be distinguished from *davyi fulvus* by the larger size and the position and less crowded character of the first upper premolar.

*Specimens Examined*.—Five alcoholic specimens. Dominica. [U. S. N. M.]

***Dermonotus davyi fulvus* (Thomas).**

1872. *Pteronotus Davyi* Peters, Monatsber. K. Preuss. Akad. Wissensch., Berlin, p. 361. [Brazil; Mexico.] (Part.)  
 1879. *Chilonycteris davyi* Alston, Biol. Cent.-Amer., Mamm., p. 36. [Mexico; Venezuela; Trinidad; Brazil.] (Part.)  
 1890. *Pteronotus davyi* J. A. Allen, Bull. Amer. Mus. Nat. Hist., III, p. 178. [Plains of Colima, Mexico.]  
 1892. *Ch[ilonycteris] Davyi fulvus* Thomas, Ann. and Mag. Nat. Hist., 6th ser., X, p. 410. [Las Peñas, Jalisco, Mexico.]  
 1894. *Pteronotus davyi* J. A. Allen, Bull. Amer. Mus. Nat. Hist., VI, p. 248. [South shore of Lake Chapala, Michoacan, Mexico.] (Not of Gray.)  
 1902. *D[ermonotus] fulvus* Miller, Proc. Biol. Soc. Washington, XV, p. 155.

*Type Locality*.—Las Peñas, Jalisco, Mexico.

*Distribution*.—Specimens have been examined or recorded from localities from Tehuantepec to the type locality in Jalisco on the west coast, and from Apazote, Campeche, to Mirador, Vera Cruz, on the Atlantic side.

*General Characters*.—Similar to *D. fulvus*, but the size is less and the first upper premolar is more crowded and with the greatest length transverse.

*Head, membranes* and other external characters as in *Dermonotus davyi*.

*Skull and Teeth*.—Essentially as in *D. davyi*, except for the smaller size and the crowded character of the first upper premolar. This tooth is strongly crowded between the canine and second premolar, and in consequence is twisted so that the greatest length is almost transverse.

*Color*.—Brown phase: Fur above vandyke-brown; below ecru-drab, the hair seal-brown basally. Membranes and ears clove-brown. Rufous phase: Fur above rich tawny, below golden ochraceous, hair cinnamon basally. Membranes and fur as in the rufous phase. From the series examined it would appear that the individuals are equally divided between the two phases.

*Measurements*.—Average of series: Total length [20]<sup>4</sup> 63.3 (59.7–73.5) mm.; head and body [21] 47.2 (41.5–60.5); head [20] 17.1 (16–18.5); ear [20] 14.9 (12.5–16); tragus [20] 4.7 (4.2–5); forearm [30] 44.1 (42.5–46); thumb [30] 7.3 (7–9); third digit [20] 74.7 (71–78); tibia [30] 17.1 (16–19); calcaneum [18] 20 (18–23); foot [30] 9.9 (8.5–10.8); tail [23] 20.5 (18–24.3).

Average of series of skulls: Total length [10] 15.5 (15–16); greatest zygomatic width [9] 8.7 (8.2–9.3); interorbital width [10] 3.6 (3.5–3.9); height at base of second premolar [11] 3.4 (3–3.9); height of brain-case [8] 6.3 (6–6.8); width of palatal constriction [9] 1.3 (1.2–1.5); length of palate from anterior foramina [9] 6.2 (6–6.5); width of palate in-

<sup>4</sup>Number of individuals in brackets.

cluding teeth [11] 5.9 (5.8–6); greatest length of mandible [10] 11.7 (11.3–12.3); breadth of brain-case above roots of zygomata [9] 7.8 (7.4–8).

*Remarks.*—The slightly smaller general size and the character of the first upper premolar will be found to separate this race from typical *davyi*. The characters are, however, such that merely subspecific rank should be accorded it. The range of variation in size in *davyi fulvus* is very considerable, and does not appear to depend on sex or locality.

*Specimens Examined.*—Thirty-one, eleven skins, twenty alcoholic individuals:

- Tehuantepec, Mexico. [U. S. N. M.] [6.]
- Santa Efigenia, Tehuantepec, Mexico. [U. S. N. M.] [2.]
- Apazote, Campeche, Mexico. [Biological Surv.] [1.]
- San Andres Tuxtla, Vera Cruz, Mexico. [Biolog. Surv.] [11.]
- Mirador, Vera Cruz, Mexico. [U. S. N. M.] [7.]
- Acapulco, Guerrero, Mexico. [Biolog. Surv.] [2.]
- Hacienda Magdalena, Colima, Mexico. [Biolog. Surv.] [1.]
- Plains of Colima, Mexico. [A. M. N. H.] [1.]